

## ELECTRONIC INFORMATION DISCLOSURE STATEMENT

Electronic Version v18

Stylesheet Version v18.0

Title of  
Invention

METHOD AND APPARATUS FOR DIVERSITY ANTENNA  
BRANCH SELECTION

Application Number: 09/800231

Confirmation Number: 3328

First Named Applicant: James Crawford

Attorney Docket Number: 69901

Art Unit: 2681

Examiner: Eliseo Ramos

Search string: ( 5621786 or 5844900 or 6438367 or 6526264  
or 6563858 ).pn.

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### US Patent Documents

Note: Applicant is not required to submit a paper copy of cited US Patent Documents

init	Cite.No.	Patent No.	Date	Patentee	Kind	Class	Subclass
<input checked="" type="checkbox"/>	1	5621786	1997-04-15	Fischer et al.		455	436
<input checked="" type="checkbox"/>	2	5844900	1998-12-01	Hong et al.		370	342
<input checked="" type="checkbox"/>	3	6438367	2002-08-20	Crawford		455	410
<input checked="" type="checkbox"/>	4	6526264	2003-02-25	Sugar et al.		455	84
<input checked="" type="checkbox"/>	5	6563858	2003-05-13	Fakatselis et al.		375	148

### Remarks

Note: Remarks are not for responding to an office action.

These references were cited in an office action mailed June 19, 2003 in co-pending and related application no. 09/800,444 (Docket No. 69902).

### Signature

Examiner Name	Date
ELISEO RAMOS-FELICIANO PATENT EXAMINER	5/28/04

Form PTO-1449 (Modified)

**INFORMATION DISCLOSURE  
CITATION IN AN APPLICATION**

Application No.

09/800,231

Filing Date

3/6/01

First Named Inventor

Crawford

Group Art Unit

~~3662~~ 2681

Examiner Name

TBD

Attorney Docket No.

69901

Sheet 1 of 3

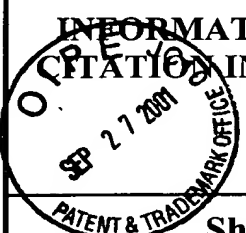
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**U.S. PATENT DOCUMENTS**











EXAMINER INITIALS*	CITE NO.	COPY NOT ENCLOSED PER 37 CFR § 1.98(d)	U.S. PATENT DOCUMENT		NAME OF INVENTOR OR APPLICANT	DATE OF ISSUANCE OR PUBLICATION (MM-DD- YYYY)	CLASS	SUB CLASS	FILING DATE (if appropriate)
			PATENT, PUB., OR APP. NO.	KIND CODE (if known)					
<i>CR</i>	AA		09/800,444		Crawford	N/A	—	—	3/6/01
<i>CR</i>	AB		5,990,738		Wright, et al.	11/23/99	330	149	12/17/98
<i>CR</i>	AC		5,990,734		Wright, et al.	11/23/99	330	2	12/17/98
<i>CR</i>	AD		5,991,289		Huang, et al.	11/23/99	370	350	8/5/97
<i>CR</i>	AE		5,970,397		Klank, et al.	10/19/99	455	139	6/30/97
<i>CR</i>	AF		5,953,311		Davies, et al.	9/14/99	370	210	2/18/97
<i>CR</i>	AG		5,886,749		Williams, et al.	3/23/99	348	614	1/28/97
<i>CR</i>	AH		5,889,759		McGibney	3/30/99	370	207	8/13/96
<i>CR</i>	AI		5,940,406		Bolle	8/17/99	370	481	6/20/96
<i>CR</i>	AJ		5,732,113		Schmidl, et al.	3/24/98	375	355	6/20/96
<i>CR</i>	AK		5,652,772		Isaksson, et al.	7/29/97	375	367	1/22/96
<i>CR</i>	AL		5,815,488		Williams, et al.	9/29/98	370	206	9/28/95
<i>CR</i>	AM		5,657,313		Takahashi, et al.	8/12/97	370	491	8/11/95
<i>CR</i>	AN		5,732,068		Takahashi, et al.	3/24/98	370	206	5/9/95
<i>CR</i>	AO		5,487,069		O'Sullivan, et al.	1/23/96	370	404	11/23/93
<i>CR</i>	AP		5,371,548		Williams	12/6/94	348	478	7/9/93
<i>CR</i>	AQ		5,345,440		Gledhill, et al.	9/6/94	370	210	1/7/93
<i>CR</i>	AR		5,282,222		Fattouche, et al.	1/25/94	375	260	3/31/92

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*CR* 9/28/04

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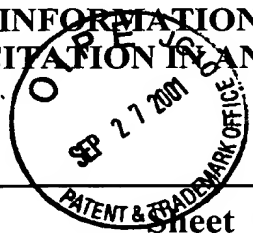
Form PTO-1449 (Modified)  <b>INFORMATION DISCLOSURE CITATION IN AN APPLICATION</b>    Sheet 2 of 3	Application No.	09/800,231
	Filing Date	3/6/01
	First Named Inventor	Crawford
	Group Art Unit	<del>3662</del> 2681
	Examiner Name	TBD
	Attorney Docket No.	69901

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OTHER DOCUMENTS -- NON PATENT LITERATURE DOCUMENTS			
EXAMINER INITIALS*	CITE NO.	COPY NOT ENCLOSED PER 37 CFR § 1.98(d)	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.
	AS		A. HANSON, et al.; "Master Thesis: Performance Improvements When Using Diversity on OFDM Systems"; Ericsson; (May 3, 2001); pp. 1-70
	AT		M. OKADA, et al.; "Pre-DFT Combining Space Diversity Assisted COFDM"; IEEE Transactions on Vehicular Technology, Vol. 50, No.2, (March 2001); pp. 487-496
	AU		EUROPEAN TELECOMMUNICATIONS STANDARDS INSTITUTE 2000 (ETSI); "Broadband Radio Access Networks (BRAN); HIPERLAN Type 2; Physical (PHY) Layer"; Technical Specification; <a href="http://www.etsi.org">http://www.etsi.org</a> ; pp. 1-40; ETSI TS 101 475 V1.1.1 (2000-04)
	AV		M. UMEHIRA, et al.; "Introduction to MMAC Multimedia Mobile Access Communications Systems"; APCC2000 Tutorial: Introduction to MMAC; pp.1-57 (October 30, 2000)
	AW		M. SPETH, et al.; "Optimum Receiver Design for Wireless Broad-Band Systems Using OFDM - Part I"; IEEE Transactions on Communications, (November 1999); pp. 1668-1677; Vol. 47, No. 11
	AX		IEEE COMPUTER SOCIETY; "DRAFT Supplement to STANDARD [for] Information Technology-Telecommunications and Information Exchange Between Systems-Local and Metropolitan Area Networks-Specific Requirements-Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications: High Speed Physical Layer in the 5 Ghz Band"; IEEE P802.11a/D7.0; Supplement to IEEE Standard 802.11-1999; (1999); pp. 1-90
	AY		R. CASTLE, et al.; "A 20 Mbits /s OFDM Demonstrator at 5 Ghz: System Design, Implementation and Experimental Results"; (February 1998); Title page, pp. 1-5; Hewlett Packard Laboratories Home Communications Department; Bristol, UK
	AZ		E. LAWREY; "The Suitability of OFDM as a Modulation Technique for Wireless Telecommunications, With a CDMA Comparison - Chapter 1. Introduction"; <a href="http://www.eng.jcu.edu.au/eric/thesis">http://www.eng.jcu.edu.au/eric/thesis</a> ; (October 1997); pp. Title page, Abstract, and pp. 1-21; James Cook University; North Queensland, Australia
	BA		E. LAWREY; "The Suitability of OFDM as a Modulation Technique for Wireless Telecommunications, With a CDMA Comparison - Chapter 2. OFDM Results"; <a href="http://www.eng.jcu.edu.au/eric/thesis">http://www.eng.jcu.edu.au/eric/thesis</a> ; (October 1997); pp. 1-26; James Cook University; North Queensland, Australia
	BB		E. LAWREY; "The Suitability of OFDM as a Modulation Technique for Wireless Telecommunications, With a CDMA Comparison - Chapter 3. CDMA Results"; <a href="http://www.eng.jcu.edu.au/eric/thesis">http://www.eng.jcu.edu.au/eric/thesis</a> ; (October 1997); pp. 1-10; James Cook University; North Queensland, Australia

ELISEO RAMOS-FELICIANO  
PATENT EXAMINER

 9/29/01

Form PTO-1449 (Modified)	Application No.	09/800,231
<b>INFORMATION DISCLOSURE CITATION IN AN APPLICATION</b> 	Filing Date	3/6/01
	First Named Inventor	Crawford
	Group Art Unit	<del>2662</del> 2681 OCT 01 2001
	Examiner Name	TBD
Sheet 3 of 3	Attorney Docket No.	69901 TO 3600 MAIL ROOM

OTHER DOCUMENTS -- NON PATENT LITERATURE DOCUMENTS			
EXAMINER INITIALS*	CITE NO.	COPY NOT ENCLOSED PER 37 CFR § 1.98(d)	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.
TD	BC		E. LAWREY; "The Suitability of OFDM as a Modulation Technique for Wireless Telecommunications, With a CDMA Comparison - Chapter 4. Conclusion"; <a href="http://www.eng.jcu.edu.au/eric/thesis">http://www.eng.jcu.edu.au/eric/thesis</a> ; (October 1997); pp. 1-2; James Cook University; North Queensland, Australia
TD	BD		E. LAWREY; "The Suitability of OFDM as a Modulation Technique for Wireless Telecommunications, With a CDMA Comparison - Bibliography"; <a href="http://www.eng.jcu.edu.au/eric/thesis">http://www.eng.jcu.edu.au/eric/thesis</a> ; (October 1997); pp. 1-5; James Cook University; North Queensland, Australia
TD	BE		T. ENG, et al.; "Comparison of Diversity Combining Techniques for Rayleigh-Fading Channels"; <i>IEEE Transactions on Communications</i> , (September 1996); pp. 1117-1129; Vol. 44, No. 9
TD	BF		Y. WU, et al.; "Orthogonal Frequency Division Multiplexing: A Multi-Carrier Modulation Scheme"; <i>IEEE Transactions on Consumer Electronics</i> , (August 1995); pp. 392-398; Vol. 41, No. 3
TD	BG		J. LINNARTZ; "Special Issue on 'Multi-Carrier Modulation'"; <a href="http://hera.eecs.berkeley.edu/~linnartz/issue.html">http://hera.eecs.berkeley.edu/~linnartz/issue.html</a> ; Wireless Personal Communication, Kluwer; (1996); pp. 1-7; No. 1-2, 1996
TD	BH		R. PAIEMENT; "Brief Literature Review on OFDM"; <a href="http://www.db.crc.doc.ca/ottawa/cofdm">http://www.db.crc.doc.ca/ottawa/cofdm</a> ; (March 1994); pp. 1-4; COFDM Literature Review; Ottawa, Canada
TD	BI		J. BINGHAM; "Multicarrier Modulation for Data Transmission: An Idea Whose Time Has Come"; <i>IEEE Communications Magazine</i> , (May 1990); pp. 5-8, 12-14
TD	BJ		B. HIROSAKI; "An Orthogonally Multiplexed QAM System Using the Discrete Fourier Transform"; <i>IEEE Transactions on Communications</i> , (July 1981); pp. 982-989; Vol. COM-29, No. 7; Kawasaki City, Kanagawa 213, Japan
TD	BK		K. KNUDSEN, et al.; "A 26 Mbps Wireless OFDM Transceiver"; pp. 1-5; Calgary, Alberta, Canada; (date unknown)

Examiner Signature	ELISEO RAMOS-FELICIANO PATENT EXAMINER 	Date Considered	5/28/04
<p>*EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP §609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to the applicant.</p>			



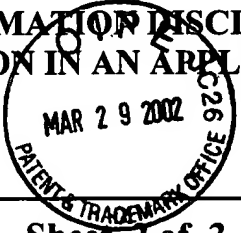
Form PTO-1449 (Modified)  <b>INFORMATION DISCLOSURE CITATION IN AN APPLICATION</b>	Application No.	09/800,231
	Filing Date	March 6, 2001
	First Named Inventor	Crawford
	Group Art Unit	3662 (268)
	Examiner Name	TBD
Sheet 1 of 3	Attorney Docket No.	69901











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U.S. PATENT DOCUMENTS									
EXAMINER INITIALS*	CITE NO.	COPY NOT ENCLOSED PER 37 CFR § 1.98(d)	U.S. PATENT DOCUMENT		NAME OF INVENTOR OR APPLICANT	DATE OF ISSUANCE OR PUBLICATION (MM-DD-YYYY)	CLASS	SUB CLASS	FILING DATE (if appropriate)
			PATENT, PUB., OR APP. NO.	KIND CODE (if known)					

OTHER DOCUMENTS -- NON PATENT LITERATURE DOCUMENTS			
EXAMINER INITIALS*	CITE NO.	COPY NOT ENCLOSED PER 37 CFR § 1.98(d)	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.
<i>GF</i>	AA		ALOUINI, MOHAMED-SLIM, et al.; "Multichannel Reception Of Digital Signals Over Correlated Nakagami Fading Channels;" 36th Annual Allerton Conference on Communications; September 1998; pp.1-10; Control and Computing, Monticello, IL
<i>ED</i>	AB		ANNAMALAI, A., et al; "Equal-Gain Diversity Receiver Performance In Wireless Channels;" IEEE Transactions On Communications; October 2000; pp. 1732-45; Vol. 48; No. 10; IEEE
<i>ED</i>	AC		BAHCECI, ISRAFIL, et al.; "Diversity Combining For Fading Channels;" <a href="http://www.eas.asu.edu/~trccomm/nsf/presentations/Apr_4_Israfil_Bahceci.pdf">http://www.eas.asu.edu/~trccomm/nsf/presentations/Apr_4_Israfil_Bahceci.pdf</a> ; April 4, 2000; pp. 1-13; Arizona State University, College of Engineering and Applied Sciences
<i>ED</i>	AD		CIMINI, LEONARD J., et al.; "OFDM With Diversity And Coding For Advanced Cellular Internet Services;" IEEE 1997; pp. 305-9; IEEE
<i>ED</i>	AE		ENG, Thomas, et al.; "Correction To 'Comparison of Diversity Combining Techniques for Rayleigh-Fading Channels;" IEEE Transactions on Communications; September 1998; p. 1111; Vol. 46; No. 9; IEEE
<i>GF</i>	AF		KIM, CHANG-JOO, et al.; "SER Analysis Of QAM With Space Diversity In Rayleigh Fading Channels;" ETRI Journal; January 1996; pp. 25-35; Vol. 17; No. 4
<i>ED</i>	AG		KONG, NING, et al.; "A Closed Form Expression For The Average SNR When Combining An Arbitrary Number of Diversity Branches With Non Identical Rayleigh Fading Statistics;" IEEE 1999; pp.1-5; IEEE


**ELISEO RAMOS-FELICIANO**  
PATENT EXAMINER *ED* 5/23/04



Form PTO-1449 (Modified)  <b>INFORMATION DISCLOSURE CITATION IN AN APPLICATION</b>    Sheet 2 of 3	Application No.	09/800,231
	Filing Date	March 6, 2001
	First Named Inventor	Crawford
	Group Art Unit	3662 263/
	Examiner Name	TBD
	Attorney Docket No.	6990 GROUP 3600

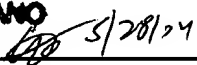
OTHER DOCUMENTS -- NON PATENT LITERATURE DOCUMENTS			
EXAMINER INITIALS*	CITE NO.	COPY NOT ENCLOSED PER 37 CFR § 1.98(d)	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.
	AH		LEE, DENNIS, et al.; "Antenna Diversity For An OFDM System In A Fading Channel;" IEEE 1999; pp. 1104-09; IEEE
	AI		LO, TITUS K.Y.; "Maximum Ratio Transmission;" IEEE Transactions On Communications; October 1999; pp. 1458-61; Vol. 47; No. 10; IEEE
	AJ		LOTT, M., et al.; "Radio Channel Characteristics For Typical Environments At 5.2 GHz;" ACTS Mobile Communication Summit; October 1997; pp.1-6
	AK		NARULA, ARADHANA, et al.; "Performance Limits Of Coded Diversity Methods For Transmitter Antenna Arrays;" IEEE Transactions On Information Theory; November 1999; pp. 2418-33; Vol. 45; No. 7; IEEE
	AL		RAINISH, DORON; "Diversity Transform For Fading Channels;" IEEE Transactions On Communications; December 1996; pp. 1653-61; Vol. 44; No. 12; IEEE
	AM		RAMASAMI, VIJAYA CHANDRAN; "EECS 862 Project - Ber Performance Over Fading Channels And Diversity Combining;" <a href="http://www.ittc.ukans.edu/~rvc/acads/project1.pdf">http://www.ittc.ukans.edu/~rvc/acads/project1.pdf</a> ; March 7, 2001; pp. 1-17; Information & Telecommunication Technology Center, University of Kansas
	AN		SWINDLEHURST, A., et al.; "Subspace Fitting With Diversely Polarized Antenna Arrays;" IEEE Trans. Antennas & Propagation; December 1993; pp. 1-22
	AP		WIN, MOE Z., et al.; "Analysis Of Hybrid Selection/Maximal-Ratio Combining In Rayleigh Fading;" IEEE Transactions on Communications; December 1999; pp. 1773-76; Vol. 47; No.12; IEEE
	AQ		WIN, MOE Z., et al.; "Error Probability For M-ary Modulation Using Hybrid Selection/Maximal-Ratio Combining In Rayleigh Fading;" IEEE 1999; pp. 944-7; IEEE
	AR		WIN, MOE Z., et al.; "Exact Error Probability Expressions For MRC In Correlated Nakagami Channels With Unequal Fading Parameters And Branch Powers;" Communication Theory; 1999; pp. 2331-35; Global Telecommunications Conference - Globecom; IEEE

ELISEO RAMOS-FELICIANO  
PATENT EXAMINER

 5/28/07

Form PTO-1449 (Modified)  <b>INFORMATION DISCLOSURE CITATION IN AN APPLICATION</b>  	Application No.	09/800,231
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	First Named Inventor	Crawford
	Group Art Unit	3662 2661
	Examiner Name	TBD
Sheet 3 of 3	Attorney Docket No.	69901

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	AO		WIN, MOE Z., et al.; "MRC Performance For <i>M</i> -ary Modulation In Arbitrarily Correlated Nakagami Fading Channels;" IEEE Communications Letters; October 2000; pp. 301-3; Vol. 4; No. 10; IEEE
	AS		WINTERS, JACK H., et al.; "Upper Bounds On The Bit-Error Rate Of Optimum Combining In Wireless Systems;" IEEE Transactions On Communications; December 1998; 1619-24; Vol. 46; No. 12; IEEE

Examiner Signature	<b>ELISEO RAMOS-FELICIANO</b> <b>PATENT EXAMINER</b> 	Date Considered	5/24/04
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